

CLAIMS

DO NOT ENTER
8/6/2003

1.-3. (cancelled)

4. (currently amended) A method for forming a contact to a semiconductor substrate of a first conductivity type, comprising:

providing a semiconductor stack including an active layer formed on a first insulator layer and a masking layer over the active layer, wherein the first insulator layer is formed on the semiconductor substrate and wherein the active layer and the masking layer are patterned to have an opening;

implanting the semiconductor substrate through the opening and the first insulator layer with a first species to form a first doped region within the semiconductor substrate, wherein the first doped region is the first conductivity type and is more heavily doped than the semiconductor substrate, and wherein the masking layer operates as a mask to the implanting;

after the implanting, forming a gate dielectric on the active layer;

forming a gate electrode on the gate dielectric;

forming a source region in the active layer adjacent a first side of the gate electrode;

forming a drain region in the active layer adjacent a second side of the gate electrode, wherein the second side is opposite the first side; and

forming a first contact electrically connected to the first doped region .

5. (cancelled)

6. (original) The method of claim 4, wherein the first dopant species is p-type.

7. (original) The method of claim 6, wherein the first dopant species is boron.

8. (original) The method of claim 7, wherein first dopant is doped using the implanting uses an energy of approximately 100KeV.

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9. (original) The method of claim 1, further comprising:
forming an interlayer dielectric layer over ~~the second insulator layer and the active layer~~
and the first doped region;
etching a first opening in the interlayer dielectric layer;
filling the first opening with a metal to form a second contact electrically connected to
the active layer; and
wherein forming a first contact further comprises:
etching a second opening through the interlayer dielectric layer, ~~the second~~
~~insulator layer, and first insulator layer~~; and filling the second opening
with the metal.

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10. (currently amended) A method of forming ^{an ohmic} ~~a~~ contact to a semiconductor substrate of a
first conductivity type, comprising:

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providing a semiconductor stack including an active layer formed on a first insulator
layer, wherein the first insulator layer is formed on the semiconductor substrate;
forming a gate dielectric over the active layer;
forming a gate electrode over the gate dielectric;
forming source and drain regions in the active layer and adjacent the gate electrode as to
form a channel region underneath the gate electrode;
removing a portion of the active layer;
forming a second insulator layer adjacent the active layer and on the first insulator layer;
forming a doped region within the substrate before forming the gate electrode and after
providing the semiconductor stack, wherein the doped region is the first
conductivity type and is ~~more heavily doped than the semiconductor substrate~~
sufficiently heavily doped to be able to form the contact;
forming a first opening in the second insulator layer and the first insulator layer; and
forming a conductive material within the first opening.

11. (cancelled)

12. (cancelled)

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13. (original) The method of claim 10⁶, further comprising forming a second opening and filling the second opening to form a contact that is electrically connected to the active layer.

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14. (original) The method of claim 10⁶, wherein the doped region is p-type.

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15. (original) The method of claim 14⁸, wherein the doped ~~portion~~ region is formed by ion implanting boron at an energy of 100KeV.

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16. (original) The method of claim 10⁶, wherein the semiconductor stack is silicon-on-insulator.

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17. (currently amended) A method of forming a contact to a semiconductor substrate of a first conductivity type, comprising:

providing a semiconductor stack including an active layer formed on a first insulator layer, wherein the first insulator layer is formed on the semiconductor substrate;

removing a portion of the active layer to form an opening in the active layer;

forming a second insulator layer adjacent the active layer and on the first insulator layer;

forming ~~an~~ a contact opening in the second insulator layer and the first insulator layer;

forming a conductive material within the contact opening;

forming a doped region within the semiconductor substrate under the area of the opening by implanting through the opening in the active layer before forming the

~~conductive material within the opening~~ second insulator layer, wherein the doped

region is the first conductivity type and is ~~more~~ sufficiently heavily doped ~~than the substrate~~ to be able to form the contact to the conductive material; and

forming a transistor in the active layer after forming the doped region.

18. (withdrawn)

19. (withdrawn)

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20. (withdrawn)

21. (withdrawn)

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